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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,518	01/02/2004	Naoki Abe	00280758AA	8684
30743	7590	06/30/2006	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C.			TIMBLIN, ROBERT M	
11491 SUNSET HILLS ROAD			ART UNIT	
SUITE 340			PAPER NUMBER	
RESTON, VA 20190			2167	

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/749,518	Applicant(s) ABE ET AL.	
	Examiner Robert M. Timblin	Art Unit 2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/2/2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This office action corresponds to application 10/749,518 filed 1/2/2004.

Claims 1-22 have been examined and are pending prosecution.

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 28.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Claims 1, 2, 5-7 and 11 are objected to because of the following informalities:

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With respect to claim 1, line 3 specifies the normal data as unlabeled while line 5 leaves the specification of "unlabeled" omitted. Examiner assumes the normal data of line 5 to be "unlabeled."

With respect to claim 2, the examiner questions if the measure of uncertainty of prediction of line 3 as being the same measure of uncertainty of prediction in claim 1 line 6. Specifically, the uncertainty of prediction of claim 1, line 6 is not specified as a measurement.

With respect to claim 5, line 4 is objected to for the assumed typographical error in "uncertain6y" and the misspelling of cost.

With respect to claims 5-7, the examiner questions if the measure of uncertainty is meant to mean a uncertainty of prediction read from claim 1.

With respect to claim 11, line 3 is objected to for the grammatical error "reading a storing."

Appropriate correction is required.

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 18-21 are rejected under 35 U.S.C. 102(e) as being anticipated by **Yamanishi et al.** ('Yamanishi') (U.S. 2003/004902 A1).

With respect to claim 18, **Yamanishi** teaches A data processing system for outlier detection comprising:

**'a top control module controlling overall control flow, making use of various sub-components of the system'** as an outlier detection program (0041-0042 and drawing reference 200).

**'a learning algorithm storage module storing a representation of an algorithm for classification learning'** (drawing references 14, 24, and 34).

**'model output module storing models obtained as a result of applying the learning algorithm stored in learning algorithm storage module to training data and outputting a final model by aggregating these models'** (0025 and figure 6).

**'a selective sampling module accessing data stored in a data storage module** (drawing references 13, 23), **selectively sampling a relatively small subset**

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of the data, and passing the obtained sub-sample to the top control module' (0015-16).

With respect to claim 19, Yamanishi teaches **'the learning algorithm storage module stores an arbitrary algorithm for classification'** (drawing reference 92).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanishi in view of Acharya et al ('Acharya') (U.S. 6,519,604).

With respect to claim 1, Yamanishi teaches A method of outlier detection comprising the steps of:

**'reducing an outlier detection problem to that of a classification learning problem using unlabeled normal data as positive examples and randomly generated synthesized examples as negative examples'** (paragraphs 14, 66-69, 71, and 81).

Yamanishi fails to teach selectively sampling normal and synthesized examples based on uncertainty of prediction to further reduce an amount of data required for data

analysis, resulting in enhanced predictive performance while minimizing computational resources including storage requirements.

**Acharya**, however, teaches this limitation as extracting congressional examples leading to efficient storing of sampled tuples in a few memory locations (col. 4 line 31-61).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references because the calculation presented by Acharya would have provided Yamanishi's system with efficiently storing sampled data in a few memory locations (col. 4 line 35-40, **Acharya**). Furthermore, Acharya teaches that given a fixed amount of space, congressional sample maximizes accuracy for querying data (col. 4 line 45-52).

With respect to claim 2, **Acharya** teaches '**setting sampling probability equal to a measure of uncertainty of prediction for the example**' (col. 8 line 8-55).

With respect to claims 3 and 6, **Acharya** teaches '**the measure of uncertainty of prediction is binomial**' (col. 9 line 30-67).

With respect to claims 4, and 7, '**the measure of uncertainty of prediction is Gaussian** (col. 7 and 8 equations).

With respect to claims 5 and 17, **Acharya** teaches '**setting sampling probability proportional to a product of a measure of uncertainty and a measure**

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**of cost of mis-classifying the same example'** as providing probabilistic error/confidence (col. 11 line 14-20).

With respect to claim 8 , Acharya teaches **'the measure of cost is determined as a relative cost of mis-classifying the example in the training data'** (col. 9 line 10-28 and col. 10 line 19-34).

With respect to claims 9, 10 and 20, Yamanishi teaches **'classification learning problem employs an arbitrary algorithm for classification'** (0070-0074).

With respect to claim 11, Acharya, teaches this calculation method as [congressional] samples formed from a union of different sized uniform random samples of various groups in the relation (col. 5 line 59-64 and col. 12 line 2-12).

With respect to claim 12, Yamanishi teaches **'the step of selective sampling uses an underlying, arbitrary classification learning algorithm and proceeds iteratively'** (0095-0096).

With respect to claim 13, Yamanishi teaches **'training of the underlying classification algorithm with the selected data'** (0068).

Yamanishi fails to teach selecting a smaller sub-sample from the input data and storing a classifier output by the classification algorithm.



Acharya, however teaches **'selecting a smaller sub-sample from the input and data'** as decreasing the sampling size (col. 9 line 11-28).

**'storing a classifier output by the classification algorithm'** as inserting the new tuple into the relation (col. 9 line 20-27).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references because the combination would have given Yamanishi's invention a cost efficient algorithm (col. 9, line 15-20, Acharya).

With respect to claim 14, Yamanishi teaches **'the step of selecting is done by choosing examples that are harder to classify with the classifiers obtained in preceding iterations'** as selecting higher scored data (0081).

With respect to claim 15, Yamanishi teaches **'outputting an output hypothesis as a voting function of classifiers obtained in the iterations'** as filtering of data x (0075-0080).

With respect to claim 16, Yamanishi teaches **'the step of selecting is done by choosing each example with a sampling probability which is set equal to a measure of uncertainty of predicting a label of that example by a collection of hypotheses obtained by calls to the classification algorithm in earlier iterations'** (0081-0082).

With respect to claim 21, Yamanishi teaches 'the data storage module comprises two separate modules, one for storing real data corresponding to "normal" data, and the other for storing synthesized data corresponding to "abnormal" data' as holding data in outliers 1 and 2 (0102-0104) and figures 3 and drawing reference 505 of figure 5).

With respect to claim 22, Acharya teaches 'data storage module comprises a single data storage module providing two logical data storage modules in a single physical data storage module, one for storing real data corresponding to "normal" data, and the other for storing synthesized data corresponding to "abnormal" data' as groups of examples within the same database (abstract, col. 5 line 38-58 and figure 2).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent documents:

**6,424,929**

**6,405,318**

**6,643,629**

**2003/0204320**

**2003/0236652**


**2004/0230586**


### Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert M. Timblin whose telephone number is 571-272-5627. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leslie Wong   
Primary Examiner

Robert M. Timblin  
  
Patent Examiner AU 2167

RMT  
6/15/06